

No. 634,285.

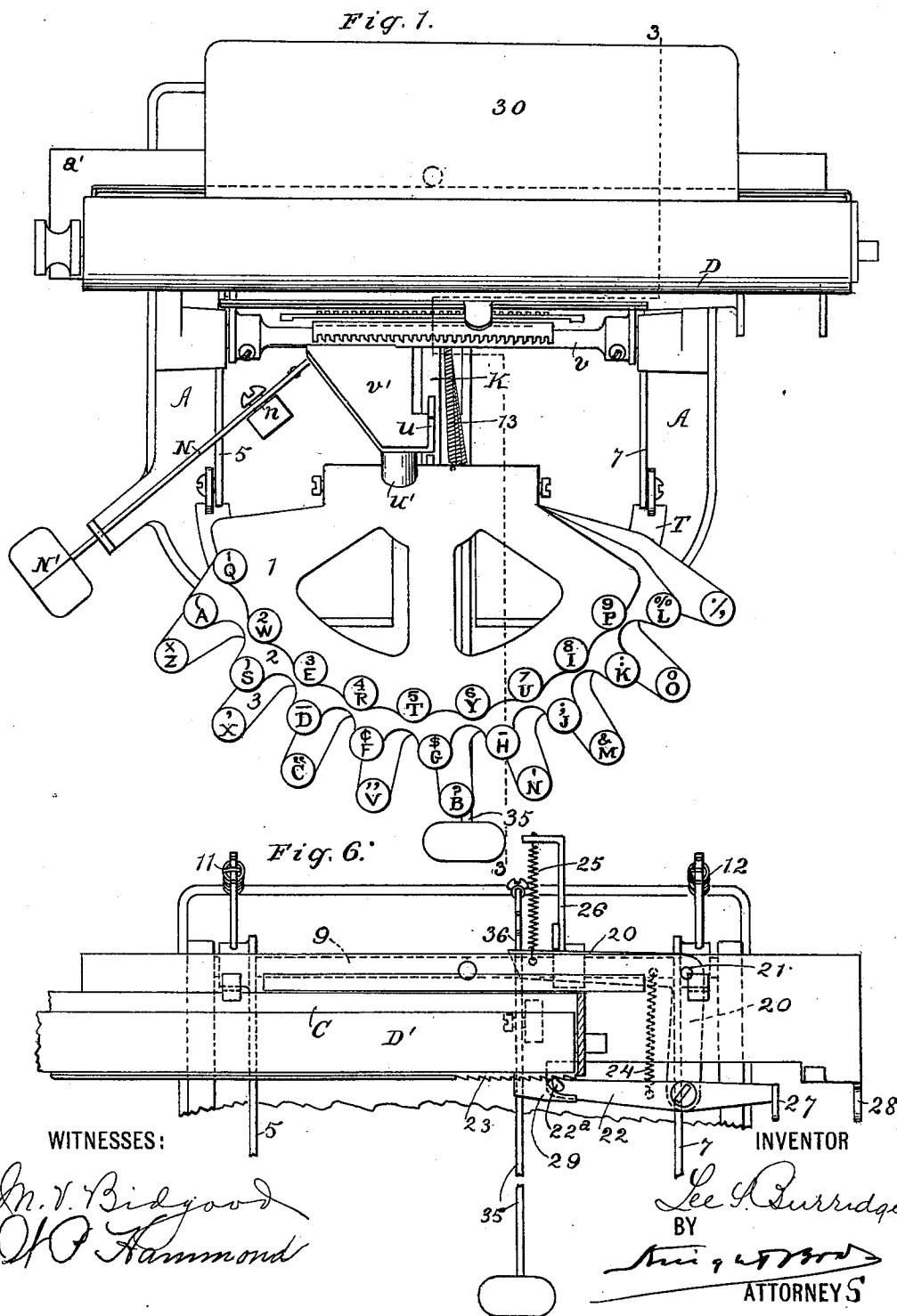
Patented Oct. 3, 1899.

L. S. BURRIDGE.
TYPE WRITING MACHINE.

(Application filed May 5, 1898.)

(No Model.)

3 Sheets—Sheet 1.



No. 634,285.

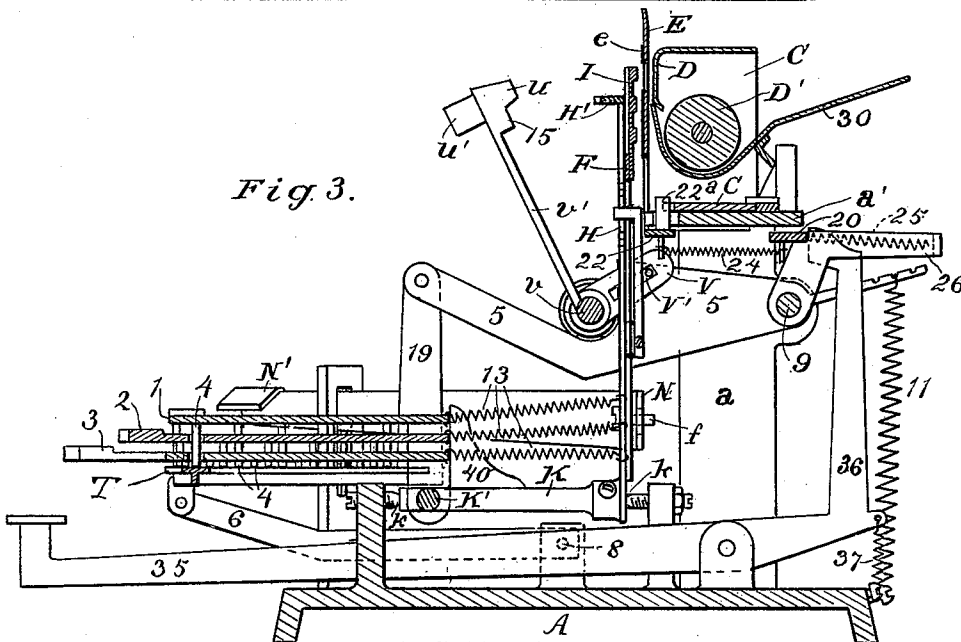
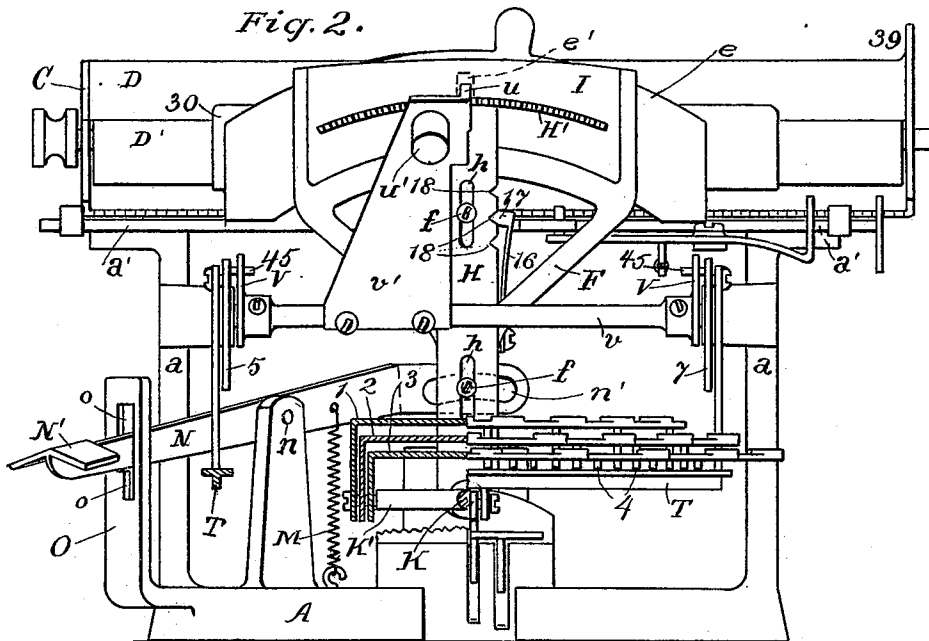
Patented Oct. 3, 1899.

L. S. BURRIDGE.
TYPE WRITING MACHINE.

(Application filed May 5, 1898.)

(No Model.)

3 Sheets—Sheet 2.



WITNESSES:

W. V. Bidgood
W. P. Hammond

INVENTOR

Lee S. Burrige

BY

Wm. H. Burr

ATTORNEYS.

No. 634,285.

Patented Oct. 3, 1899.

L. S. BURRIDGE.
TYPE WRITING MACHINE.

(Application filed May 5, 1898.)

(No Model.)

3 Sheets—Sheet 3.

Fig. 4.

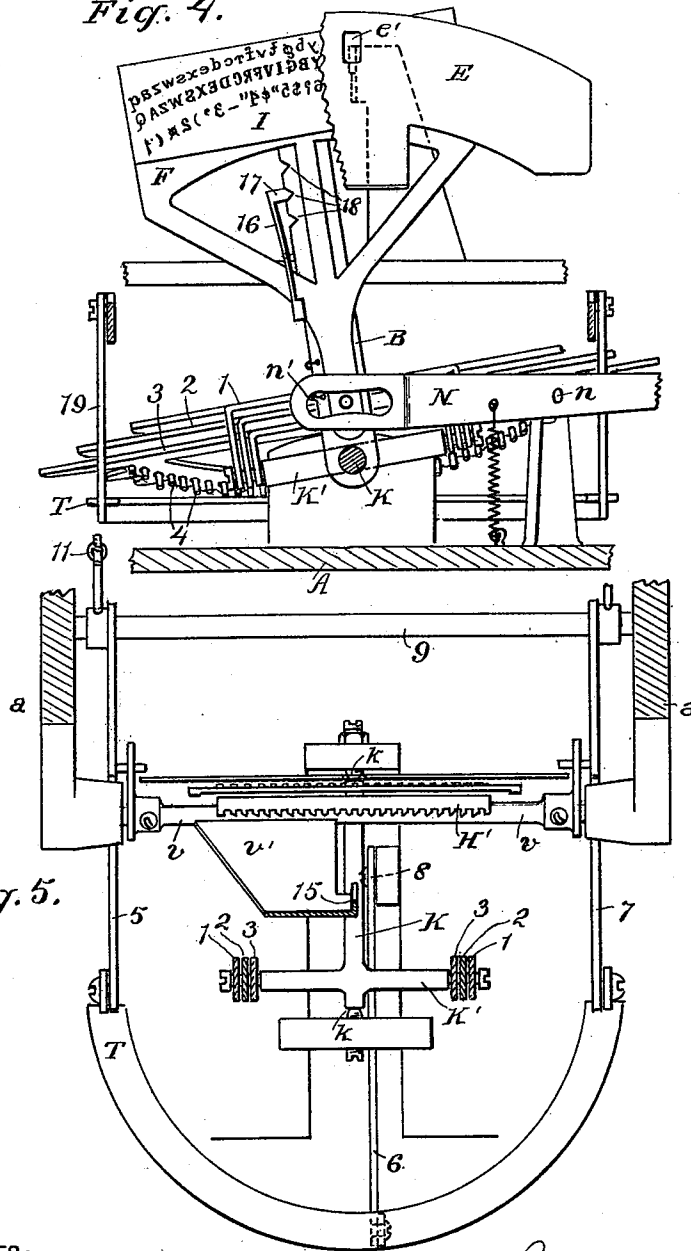


Fig. 5.

WITNESSES:

M. V. Bidgood
H. P. Hammond

INVENTOR

Lee S. Burrige

BY

Amos W. Bond

ATTORNEYS.

UNITED STATES PATENT OFFICE.

LEE S. BURRIDGE, OF NEW YORK, N. Y.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 634,285, dated October 3, 1899.

Application filed May 5, 1898. Serial No. 679,820. (No model.)

To all whom it may concern:

Be it known that I, LEES. BURRIDGE, a citizen of the United States, residing at New York, county and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to improvements in type-writing machines; and its object is to provide a machine having many of the advantages as regards ease and quickness of operation of the machines with independent keys, while avoiding the complication and expense of the multiplicity of key and type levers which are generally associated with independent-key movements. For this purpose I provide a keyboard having one or more banks of keys arranged to move simultaneously on two horizontal axes at right angles to one another and a type-carrier operatively connected to the keyboard mechanism, so that angular movement of the latter around one of its axes will result in shifting of the type-carrier to bring the different types into the printing position, while at the same time the vertical movement of the keyboard mechanism, due to its movement on either or both axes, will bring the type into contact with the platen or the paper thereon and thus effect the impression. Such impression is preferably effected by a hammer, which is thrown against the type-carrier by the action of the keyboard mechanism.

Specifically my invention comprises the following operative elements: a type-carrier pivoted to swing in a vertical plane parallel to the type-carrying surface and parallel and in proximity to the plane of impression on the platen, said type-carrier having the type mounted thereon, so as to have a slight movability toward and away from the platen; a keyboard mechanism having one or more banks of keys pivoted on a cross-arm extending parallel to the platen, this cross-arm being fixed to a rock-shaft supporting the type-carrier and extending at right angles to same; a universal bar extending under the keyboard mechanism and operated by the vertical movement of any of the banks of keys thereon; a stop and hammer mechanism operated by said universal bar to arrest the motion of the type-carrier and throw against

the platen the type which is for the time being in front of the printing-point, and means hereinafter described for feeding the platen forward, for shifting the type-carrier to bring different sets of type into operative position, and for inking the type.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 is a top view of a type-writing machine embodying my invention. Fig. 2 is a front view of same. Fig. 3 is a vertical section of the machine on line 3 3 of Fig. 1. Fig. 4 is a sectional view of part of the machine, looking from the rear of the type-carrier. Fig. 5 is a partly-sectional top view of the type-carrier and hammer and their actuating mechanism. Fig. 6 is a top view of the platen-carriage and its feed mechanism, the carriage-cover being removed.

A represents the frame of the machine, having standards *a*, on which the carriage-bed *a'* is supported. The carriage C is arranged to slide laterally on this bed and carries the non-rotary platen D and feeding-roller D'. Immediately in front of this platen is a vertical plate E, to whose front is fastened the inking pad or cloth *e*.

The type-carrier F is arranged in a vertical plane parallel to and immediately in the rear of plate E and is mounted on the rock-shaft K, so as to turn therewith as the latter rocks on its bearings *k*, but to be capable also of an independent vertical or radial movement. For this purpose the means of connection of rock-shaft *k* to the type-carrier is an arm H, which has vertical slots *h*, in which engage pins or screw-studs *f* on the type-carrier. The type-carrier consists at its upper part of an open frame, to which the flexible type-sheet I is secured at its edges. This flexible type-sheet I is preferably of soft rubber and has the type characters formed thereon or attached thereto, as indicated in Figs. 3 and 6. In the center of the inking-pad and its supporting-plate is a hole *e'*, and the type characters are brought to register therewith and are projected through the same, so as to effect the impression by the operation of the keyboard mechanism. The type characters are arranged in three series, one above another, on said type-sheet, and a shift-key mechanism is provided for moving the type-carrier

vertically or radially, as permitted by studs and slots *f h*, so as to bring any one of these series of type opposite the hole *e'*, or what may be termed the "printing-point." Such mechanism comprises a shift-key lever N, pivoted at *n* to the frame of the machine and having a slot *n'* at its rear end engaging with a stud which may be the rearward prolongation of one of the studs *f* on the type-carrier.

F. A spring M holds the rear end of lever N down, so that normally the upper series of type are in line for printing. At the forward end of lever N is a key N', extending on both sides of the lever N. Said lever is sufficiently thin or is mounted with sufficient capacity of side motion to enable it to move to one side or the other, according to which side of key N' is pressed, and the lever works in a slot *o* in guide-plate O, the bottom of which slot is at different depths on the two sides, so that as the key N' is pressed on one side or the other the key-lever will be stopped at different heights, and thus the middle or the bottom series of type will be brought into operative position as the case may be. The slot *n* is long enough to permit of the lateral swinging motion of the type-carrier on its pivot or axis K and is sufficiently high or wide to allow the pin or stud *f* to play freely therein. A flat spring 16 on the type-carrier carries a triangular wedge 17 at one end, engaging in three corresponding notches 18 in the side of arm II, so as to retain the type-carrier either in its upper, lower, or medium position. Its wedge action also enables it to free the type-carrier to proper position, so that exact alinement of the type is obtained notwithstanding the loose motion allowed between slot *h* and stud *f*.

The rock-shaft K carries a cross-arm K', extending laterally of the machine and having independently pivoted to its ends the several keyboard-plates 1 2 3, each of which has a series of character-marks arranged as in the usual independent-key machine, the marks of each series, however, in this case being all on one rigid plate. I have shown the keyboard as divided into three banks or series of characters on the respective plates 1 2 3, and each of these plates carries on its under side a series of pins 4, which are arranged between the respective characters on said plates. These characters are here shown as formed on raised buttons or knobs on the plates for greater convenience in operation, and they are arranged in circular series or are preferably arranged in semicircular series, as shown.

A semicircular universal bar T extends under all the pins on the keyboard-plates 1 2 3, said pins being preferably arranged on the same semicircular line, the pins from the upper plates 1 2 extending freely through holes in the plates below them. This universal bar is pivoted near the middle to a vertically-swinging link 6, pivoted at 8 to the machine-frame, and said bar is pivoted at the respective sides to the levers 5 7, fixed on a rock-

shaft 9 at the back of the machine, so as to enable said universal bar to move vertically. Said levers 5 7 being higher up than the semicircular universal bar, the latter is provided at each end with an upright arm 19 or extension fixed thereto, and the levers 5 7 are pivoted to the upper ends of said arms.

The construction of the universal bar T, by reason of its pivotal bearing to link 6 and levers 5 7, is such that it will always maintain its level, and although semicircular in form it can be depressed at any portion of the semicircle and will act with equal leverage upon the levers 5 7.

Springs 11 12, acting on levers 5 7, tend to raise the forward ends of same and thus force the universal bar T up against the pins 4. All of the plates 1 2 3 are thereby held against the stop or lug 40 on the rock-shaft K.

When any one of the keyboard-plates is pressed upon at any point, the universal bar is depressed by the action of the pins on that plate, and the other keyboard-plates will then fall also as the supporting universal bar is withdrawn. Springs 13 may, however, be provided to resist to any desired extent the gravitating tendency of the keyboard-plates.

A rock-shaft *v*, extending parallel to the platen, carries a hammer-arm *v'*, provided with a projection or head *u* and with a weight *u'*. Arms V on said rock-shaft engage by slots V' with pins 45 on the levers 5 7, so that as the said levers 5 7 are depressed by the action of the universal bar the hammer-arm *v'* will be thrown toward the platen, and its head *u* will strike the flexible type-sheet directly back of the type character which is for the time being in line with said hammer-head and with the hole *e* in the ink-pad plate, and such type-character will thus be carried to project through the hole *e* and impinge upon the paper on the platen, thus effecting the impression. In order that this impression shall be effected with certainty, the hammer is provided with the head *u'*, whose momentum drives the hammer-head forcibly against the back of the type. At the top of the arm II on rock-shaft *k* is a cross-bar II', preferably about concentric with the axis of said rock-shaft and having notches in its front edge, wherein engages a stop-flange 15 on the hammer-arm *v'*, so that as said hammer-arm approaches the type-carrier and just before it strikes the back of the type-sheet this stop-flange engages in some one of the said notches, thus locking the type-carrier against further angular movement around the axis K.

When the operator places a finger on any one of the character marks or keys and presses it down as far as possible, the keyboard-plate 1, 2, or 3 comprising such character-mark will turn either or both of the axes K K' until the two pins 4, immediately on each side of the key operated, force the universal bar down against its stop. Under these conditions the keyboard-plate will assume a definite angular position determined

by the location of the two pins at that time in contact. It is apparent from the circular arrangement of the pins that only two of them can be in contact at a time, and it will be seen that as the keyboard-plate tilts in any direction around its center of motion, which is the point of intersection of the axes $K K'$, its motion can in general be resolved into two components, one in the longitudinal plane of the machine around axis K' and one in a lateral plane around axis K . When a mark (in the case illustrated the character "G") which is in line with the central plane or the axis K is depressed, the motion is of course altogether around the axis K' , and the rock-shaft k , with the type-carrier F , will therefore not be rocked to one side or the other; but when any character to either side of the center is depressed the plate will receive also an angular motion around the axis of rock-shaft k , and said rock-shaft will therefore be turned to one side or the other, together with the type-carrier, to an extent determined by the distance of the depressed character and its adjacent pins from the center, thus bringing a printing-type on the type-sheet I corresponding to the character-mark struck into register with the hole e in ink-pad plate E and with the hammer-head u . Simultaneously with this registering movement of the type-carrier, due to the lateral swinging motion of the keyboard-platen, the universal bar is depressed by the tilting of such plates, whether in a lateral or longitudinal direction, and the hammer mechanism is operated, as above described, to lock the type-carrier against further angular movement and to drive the type character which has been brought to register with the hammer against the platen, it being understood that the actual impression by contact of the hammer with the type-sheet I is effected immediately after the type-carrier has been brought to rest in its shifted position by engagement of stop-flange 15 with the notched locking-plate H' . The keyboard-plate is then locked against further angular movement around axis K and can continue to move around axis K , and thus further depress the universal bar sufficiently to drive the hammer back against the type-sheet and effect the impression.

In order that the stop-flange on the hammer-arm shall move smoothly and with certainty into the proper notch in the locking-plate H , the outer ends of the teeth between notches on the latter are beveled, as shown, away from the center on each side.

I prefer to feed the carriage to effect the spacing by means of a step-by-step mechanism, (shown in Figs. 3 and 6,) the same consisting of a bent lever 20, pivoted at 21 to the bottom of the bed on which the platen slides and carrying at its front end a pawl 22, engaging with the ratchet-rack 23 on the platen-carriage. A spring 24, attached at opposite ends to the rear arm of bent lever 20 and

to the pawl 22, tends to hold the tooth 22^a of said pawl in engagement with the rack aforesaid. Another spring 25 is fastened at one end to the rear arm of lever 20 and at the other end to an arm 26, fixed on the rock-shaft 9, on which the universal levers 5 7 are fixed. Said arm 26 extends upwardly and then rearwardly, the spring 25 being fastened to its rear end. At its front end this arm 26 engages with the rear arm of bent lever 20, so that when the universal bar T and the levers 5 7 are depressed the arm 26 will turn the bent lever 20, so as to carry the forward arm of same toward the right of the machine, looking from the front, thus causing the pawl 22 to be carried over one tooth. Then when the universal bar is released and the levers 5 7 are raised by their springs 11 12 the arm 26 is carried back again and the springs 25 pull the lever 20 back to its original position, thus carrying forward the pawl 22 and with it the rack 23, so as to effect the spacing. The outer end of pawl 22 has a thumb-piece 27, by means of which, in connection with the fixed finger-plate 28, the pawl may be drawn into its disengaged position. A curved stop-plate 29 engages with the tooth 22^a on the pawl as it is thrown forward by the spring 25, so as to lock said tooth into engagement with the rack and so as to lock the rack against movement in either direction. It will be noted that when the arm 26 moves the bent lever 20 against the action of spring 25 the rear end of said spring is also moved forward, and when the universal bar is returned by its retracting-springs 11 12 the lever 20 simply follows the arm 26 back, so that the springs 11 12 in this case effect the spacing operation. By this device the keyboard mechanism is relieved of the increase of pressure which would otherwise result from attempting to operate the spacing-key lever from the universal bar.

The spacing-key lever 35 has an arm 36 also engaging with the rear arm of lever 20, and a spring 37 tends to raise the outer end of said lever. Depression of key-lever 35 operates the pawl-lever 20 in the same manner as depression of the universal bar, except that the spring 26 is not eased up thereby.

The platen D consists of a plate extending along the front end and, if desired, also over the top of the carriage, its front portion being flat when the type strikes and being rounded below to cooperate with a thin curved metal guide-plate 30, the paper passing around the feed-roller and up between the plate 30 and platen D and then over said platen. A lug 39 at one end of the platen-carriage enables the latter to be moved when released by pulling back the pawl.

I do not confine myself to the number of keyboard-plates that may be employed, as the more plates that are used the greater the distance between the key-buttons and pins or setting devices, which insures the "set" and

accuracy of the position of the type-carrier. Although I only show three keyboard-plates, in practice I have found six advantageous.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a type-writing machine, the combination with the platen, of a pivotally-mounted type-carrier provided with type yieldingly mounted thereon, keyboard mechanism comprising a pivotally-mounted plate, connection between said keyboard-plate and type-carrier, whereby the latter is moved angularly in response to angular movement of the former to bring different type into operative position, and mechanism operated by the keyboard mechanism and acting upon the yieldingly-mounted type to make the impression.

2. In a type-writing machine, the combination with the platen, of a pivotally-mounted type-carrier, provided with a plurality of yieldingly-mounted type, keyboard mechanism comprising a plate, pivotally connected to said type-carrier, so as to be movable in relation thereto in one angular direction, but to carry the type-carrier with it when moving in another angular direction, so as to bring different type into operative position according to the angular position of said keyboard-plate, and mechanism responsive to the movement of the keyboard-plate to operate the type to make the impression.

3. In a type-writing machine, the combination with the platen, of a pivotally-mounted type-carrier, having a plurality of type yieldingly mounted thereon, a keyboard mechanism comprising a plate mounted to move pivotally on two different axes, and connected to the type-carrier so that movement of same on one of its axes will cause a corresponding pivotal movement of the type-carrier, and mechanism operated by the keyboard-plate in movement thereof on either of its axes and acting upon the type to effect the impression, as set forth.

4. In a type-writing machine, the combination with the platen, of a type-carrier provided with yieldingly-mounted type, arranged in several series, said type-carrier being arranged to move in two different directions, a shift-key for determining the movement of said type-carrier in one of such directions to bring any one of the series of type into operation, and keyboard mechanism comprising an angularly-movable plate connected to the type-carrier so that its angular movement will cause a movement of the type-carrier to bring the different type of the several series into operative position, and means operated by such keyboard mechanism to move the type to make the impression.

5. In a type-writing machine, the combination with the platen, of a type-carrier having type yieldingly supported thereon, a rock-shaft supporting said type-carrier, a keyboard-plate pivotally mounted on said rock-shaft, crosswise of same, and bearing a series

of pins and a series of character-marks between said pins, a universal bar extending below said plate and engaging with said pins, stop devices operated by the movement of the universal bar to arrest angular movement of the type-carrier, and hammer mechanism operated by the movement of the universal bar to strike the type and effect the impression.

6. In a type-writing machine, the combination with the platen, of a type-carrier having type yieldingly supported thereon, a rock-shaft supporting said type-carrier, a plurality of keyboard-plates pivotally mounted crosswise on said rock-shaft, each bearing a series of pins, and a series of character-marks between said pins, a universal bar extending below and engaging with said pins and stop devices and hammer mechanism operated by the said universal bar to arrest the angular movement of the type-carrier and to strike the type to effect the impression.

7. In a type-writing machine, the combination with the platen, of a type-carrier carrying yieldingly-mounted type, a notched plate connected thereto, a rock-shaft supporting said type-carrier and notched plate, a hammer-arm engaging with the type and carrying a stop-flange engaging with said notched plate, keyboard mechanism comprising a plate pivotally mounted crosswise in said rock-shaft, a universal bar engaging with said keyboard-plate, and connections between said hammer-arm and said universal bar.

8. In a type-writing machine, the combination with a keyboard-plate pivoted to move angularly on two axes, of a spring resisting the motion on one axis.

9. In a type-writing machine, the combination with a plurality of keyboard-plates adapted to move angularly on two different axes, of springs resisting their motion about one axis.

10. In a type-writing machine, the combination of a type-carrier, a series of keys united or connected to a common plate or frame and shafts or axes lying in transverse planes, connected operatively to each other and respectively connected to the key plate or frame and the type-carrier substantially as set forth.

11. In a type-writing machine, the combination of a type-carrier, a rocking shaft or member operatively connected thereto, a transverse bar or member having operative connection with the said rocking shaft or member, a plate or frame having operative connection with one of said members, a series of keys connected to said plate or frame and a series of setting devices for said plate or frame corresponding to said keys, substantially as set forth.

12. In a type-writing machine, the combination of a type-carrier, transverse rock shafts or members operatively connected to each other and to said type-carrier, a plate or frame operatively connected to said rock shafts or members and bearing a series of keys, and setting pins or devices on said plate or frame

alternating with the keys thereon, substantially as set forth.

13. In a type-writing machine, in combination with a type-carrier, an oscillating key plate or frame having operative connection therewith and having a plurality of keys and a series of setting pins or devices for said plate or frame for the several keys, substantially as set forth.

14. In a type-writing machine, the combination of a type-carrier, a universal bar having operative means for causing a printing-impression of the type on said carrier, and an oscillating plate or frame having a plurality of keys and operatively engaging the universal bar and the type-carrier, substantially as set forth.

15. In a type-writing machine, the combination with a type-carrier having a plurality of series of type, a support on which said type-carrier is angularly and radially movable, a shift-key lever engaging with said type-carrier by a slot-and-pin connection having sufficient play to permit free angular movement of the type-carrier, and a spring snap device for maintaining the type-carrier in any one of its several positions on its support.

16. In a type-writing machine, the combination with type mechanism, keyboard mechanism, and a platen-carriage having a rack, of means responsive to the operation of the keyboard mechanism for feeding the carriage step by step, said means comprising a lever carrying a pawl engaging with the carriage-rack, an arm having connections with the keyboard mechanism, and engaging with the pawl-lever, and a spring connected to said arm and to the pawl-lever and holding said lever in engagement with said arm.

17. In a shift-key mechanism for typewriters, the combination with a yielding shift-key lever having a key extending on both sides of same, of a guide for same having a slot with lower parts of different depth in the two sides.

18. In a type-writer, the combination with the keyboard mechanism, the platen-carriage and the rack attached thereto, of a pawl-lever carrying a pawl engaging with said rack, a spring connecting the said lever to the said pawl to maintain the latter in engagement with the rack, an arm having connections with the keyboard mechanism and engaging with said pawl-lever and a spring connecting said arm with the pawl-lever to hold them in engagement.

19. In a type-writer, the combination with the keyboard mechanism, the spacing-key lever, and the platen-carriage having a rack thereon, of a pawl-lever engaging with the spacing-key lever and carrying a pawl engaging with said rack, an arm having operative connections with the keyboard mechanism and engaging with the said pawl-lever, and a spring connected to the said arm and the said pawl-lever to hold them in engagement.

20. In a type-writing machine, the combination with a keyboard mechanism comprising one or more plates mounted to move pivotally on two different axes, of a type-carrier, having but one pivotal movement, and mounted to move pivotally on only one of said axes.

21. In a type-writing machine, the combination of the type-carrier and keyboard mechanism both mounted upon the same pivotal bearing with a universal bar and hammer mechanism all operating substantially as shown and described.

22. In a type-writing machine, the combination of a type-carrier with a keyboard mechanism operatively connected thereto and consisting of a plurality of plates having a series of keys mounted on each plate, substantially as shown and described.

23. In a type-writing machine, the combination of a type-carrier with a multiple key divided into several plates all moving in unison with each other.

24. In a type-writing machine, the combination of a type-carrier with a multiple key divided into several plates for the purpose of making greater space between the key-buttons.

25. In a type-writing machine, the combination with keyboard mechanism, type-carrier and locking-comb, of hammer mechanism coöperating therewith to arrest and lock the type-carrier and impress the type upon the paper at one and the same time.

26. In a type-writing machine, the combination of a keyboard mechanism consisting of one or more segmental plates mounted to move pivotally on two different axes, with a segmental universal bar mounted to maintain its level and have equal leverage throughout substantially as set forth.

LEE S. BURRIDGE.

Witnesses:

HARRY E. KNIGHT,
M. V. BIDGOOD.